"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

BUKHMAN, A.I.; KAGAN, Ya.M.

Clinical and roentgenologic diagnosis in hyperparathytoid osteodystrophy. Khirurgiia 33 no.6:49-54 Je '57. (MIRA 10:12)

1. Iz rentgenologicheskogo otdeleniya (zav. A.I.Bukhman) Poliklinik (glavnyy vrach Z.S.Rykhlova) No.2 Kirovskogo rayzdravotdela Moskvy i rentgenodiagnosticheskogo otdela (zav. - prof. I.A.Shakhter) Gosudarstvennogo nauchno-issledovatel'skogo instituta rentgenologii i radiologii imeni Molotova (dir. - dotsent I.G.Lagunova)

(OSTEITIS FIBROSA, diag.
diag., x-ray)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M., kand.med.nauk; ASTRAKHANTSEV, F.A., nauchnyy sotrudnik

An improved method for X-ray examination of the large intestine.
Vest.rent. i rad. 33 no.2:19-24 Mr-Ap '58. (MIRA 11:6)

1. Iz rentgenodiagnosticheskogo otdela (zav. - prof. I.A.Shekhter) Gosudarstvennogo nauchno-issledovatel'skogo instituta rentgenologii i radiologii (dir. - dotsent I.G.Lagunova) Ministerstva zdravookhraneniya RSFSR.

(INTESTINE, LARGE, neoplasms
tannic acid & bis(p-acetoxyphenyl)-2-pyridylmethane prep. in x-ray diag. (Rus))
(CONTRAST MEDIA
tannic acid-bis(p-acetoxyphenyl)-2-pyridylmethane prep. in x-ray diag. of large intestine neoplasms (Rus))
(TANNIN
same)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M., starshiy nauchnyy sotrudnik; SELETSKAYA, T.S.

Radiographic study of the effect of morphine on the motor and evacuatory function of the stomach. Trudy TSentr. nauch.-issl. inst. rentg. i rad. 10:14-18 '59. (MIRA 12:9)
(STOMACH--RADIOGRAPHY) (MORPHINE)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M., starshiy nauchnyy sotrudnik

Clinical significance of angiography in peripheral circulatory disorders. Trudy TSentr. nauch.-issl. inst. rentg. i rad. 10:107-112 '59. (MIRA 12:9)

(ANGIOGRAPHY) (BLOOD VESSELS—DISEASES)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

DANILENKO, S.S., kand. med. nauk; KAGAN, Ye.M., starshiy nauchnyy sotrudnik

Combined X-ray and sleep therapy in peptic ulcer. Trudy TSentr. nauch.-issl. rentg. i rad. 10:314-321 '59. (MIRA 12:9)
(X RAYS--THERAPEUTIC USE) (SLEEP--THERAPEUTIC USE)
(PEPTIC ULCER)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M.; SKALDIN, P.V.; MIKHALCHENKO, V.A.

Significance of pneumoperitoneum and a method of double-contrasting in roentgenodiagnosis of gastric cancer. Khirurgiia 35 no. 11:61-67 N '59. (MIRA 14:1)

(STOMACH--CANCER) (PNEUMOPERITONEUM, ARTIFICIAL)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M., kand.med.nauk (Moskva)

Significance of morphine in differential diagnosis of stomach cancer [with summary in English]. Klin.med. 37 no.1:61-67 Ja '59. (MIRA 12:3)

1. Iz rentgenodiagnosticheskogo otdela (zav. - prof. I.A. Shekhter) Gosudarstvennogo nauchno-issledovatel'skogo rentgeno-radiologicheskogo instituta Ministerstva zdravookhraneniya RSFSR (dir. - dots. I.G. Lagunova).

(STOMACH NEOPLASMS, differ. diag.
x-ray after admin. of morphine (Rus))
(MORPHINE, eff.
on motor funct. of stomach, value in differ.
x-ray diag. of stomach cancer (Rus))

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M., kand.med.nauk (Moskva, V-296, Lomonosovskiy pr., d.18, ~~kv.310~~)

Hemangiomas and cystic angiomatosis of the skeleton combined with extraosseous lymphangiomatosis. Vest. rent. i rad. 35 no. 5:17-24 My-Je '60. (MIRA 14:2)

1. Iz poliklinicheskogo otdela (zav. - kand.med.nauk Ye.M.Kagan) Nauchno-issledovatel'skogo rentgeno-radiologicheskogo instituta Ministerstva zdravookhraneniya RSFSR (direktor - doktor med. nauk I.G. Lagunova).

(BONES—TUMORS)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M., starshy nauchnyy sotrudnik

Significance of roentgenology in the diagnosis of tumors of the large intestine. Khirurgiia 36 no.8:42-49 Ag '60.
(MIRA 13:11)

1. Iz rentgenologicheskogo otdela (zav. - prof. I.A. Shekhter) Gosudarstvennogo nauchno-issledovatel'skogo rentgeno-radiologicheskogo instituta Ministerstva zdravookhraneniya RSFSR.
(INTESTINES--TUMORS)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye. M.

Doc Med Sci - (diss) "Layered roentgenography-tomography in diagnostics of ailments of the bones and vessels (trunk and extremities)." Moscow, 1961. 38 pp; (Academy of Medical Sciences USSR); 250 copies; price not given; (KL, 10-61 sup, 223)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

SHEKHTER, I.A., prof. (Moskva, A-57, Novoposhchannyn ul., d.3, kv.46); KAGAN, Ye.M., kand.med.nauk

X-ray cinematography in X-ray diagnosis. Report No. 1. Vest. rent. i rad. 36 no.4:10-16 Jl-Ag '61. (MIRA 15:2)

1. Iz rentgenodiagnosticheskogo otdela (zav. - prof. I.A.Shekhter) Gosudarstvennogo nauchno-issledovatel'skogo rentgeno-radiologicheskogo instituta Ministerstva zdravookhraneniya RSFSR (dir. - prof. I.G. Lagunova).

(DIAGNOSIS, RADIOSCOPIC) (CINEFLUOROGRAPHY)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KHARITONOV, L.G. (Moskva Ye-401, Pionerskaya ul., d.13, kv.1); KAGAN, Ye.M.; BENENSON M.P.

Research on the functional characteristics of a prosthetic esophagus. Grud.khir. 4 no.6:80-83 N-D'62. (MIRA 16:10)

1. Iz 3-y kafedry khirurgii TSentral'nogo instituta usovershenstvovaniya vrachey (zav. - prof. V.I.Kazanskiy), rentgenodiagnosticheskogo otdela (zav. - prof. I.A.Shekhter) Gosudarstvennogo nauchno-issledovatel'skogo rentgenoradiologicheskogo instituta Ministerstva zdravookhraneniya RSFSR, rentgenologicheskogo otdeleniya TSentral'noy klinicheskoy bol'nitsy Ministerstva putey soobshcheniya (zav. - dotsent S.A. Sviridov)

(ESOPHAGUS—SURGERY) (PROSTHESIS)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Yefim Mikhaylovich, prof.; STAMTORKOV, M.S., red.

[Tomography of the bones and joints; the trunk and the extremities] Tomografiia kostei i sustavov; tulovishcha i konechnostei. Moskva, Meditsina, 1964. 253 p. (MIRA 17:6)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

BENTSIANOVA, V.M., dots., red.; VIKTUKINA, V.P., kand. med. nauk, red.; KAGAN, Ye.M., prof., red.; LAGUNOVA, I.G., prof., red.; PERESLEGIN, I.A., doktor med. nauk, red.; ROZENSHTRAUKH, L.S., prof., red.

[Materials of the enlarged plenum of the Board of the All-Union Scientific Society of Roentgenologists and Radiologists and of the out-of-town session of the Scientific Council of the State Scientific and Research Institute of X-Ray Radiology of the Ministry of Public Health of the R.S.F.S.R., held December 23 - 26, 1963, in Rostov-on-Don] Materialy rasshirennogo plenuma Pravleniia Vserossiiskogo nauchnogo obshchestva rentgenologov i radiologov i vyezdnoi sessii Uchenogo soveta Gosudarstvennogo nauchno-issledovatel'skogo rentgeno-radiologicheskogo instituta MZ RSFSR 23-26 dekabria 1963. goda, g.Rostov-na-Donu, Moskva, 1963. 188 p. (MIRA 18:1)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

LAGUNOV, I.G., prof., otv. red.; KAGAN, Ye.M., prof., zam. otv. red.; VIKTURINA, V.P., kand. med. nauk, red.; TSYBUL'SKIY, B.A., prof., red.; YAKHNICH, I.M., prof., red.

[40 years of the State Scientific Research Institute of X-ray Radiology of the Ministry of Public Health of the R.S.F.S.R., 1924-1964] 40 let Gosudarstvennogo nauchno-issledovatel'skogo rentgeno-radiologicheskogo instituta MZ RSFSR, 1924-1964. Moskva, GNIRRI MZ RSFSR, 1964. 347 p. (MIRA 18:1)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.M., prof.; KLIMOVA, M.K., kand. med. nauk

Aneurysmal cysts of the bones. Vest. rentg. i rad. 40 no.2: 3-9 Mr-Ap '65. (MIRA 18:6)

1. Nauchno-issledovatel'skiy rentgeno-radiologicheskiy institut Ministerstva zdravookhraneniya RSFSR i Tsentral'nyy nauchno-issledovatel'skiy institut travmatologii i ortopedii Ministerstva zdravookhraneniya SSSR, Moskva.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

[illegible], B.M., prof., [illegible], I.A., prof., [illegible], [illegible], prof., [illegible], [illegible].

Brief news. Vest. rent. i rad. 40 no.4:74-[illegible] [illegible]-Ag '65.
(MIRA 18:9)

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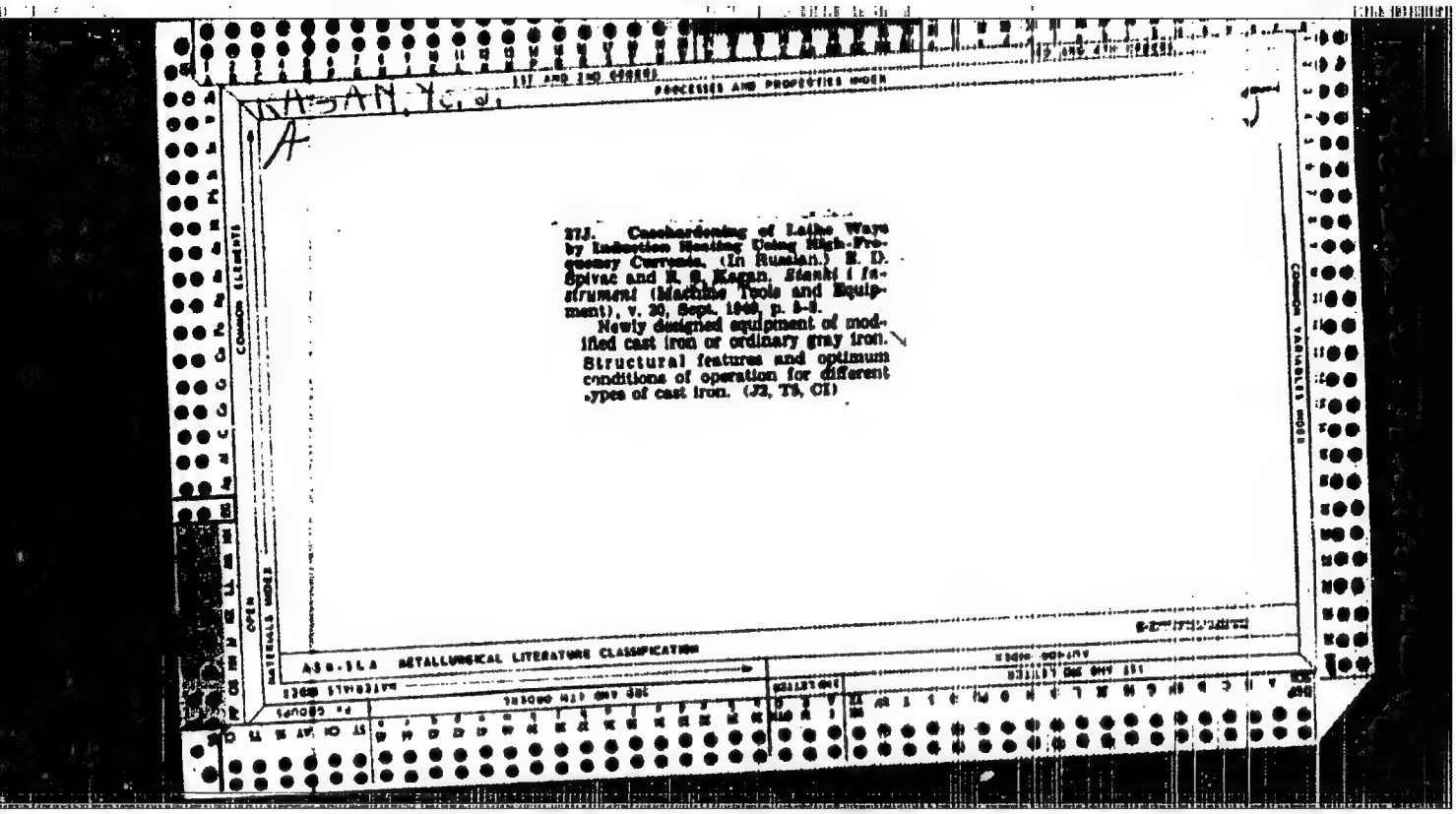
"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6



273. Case-hardening of Lathe Ways by Induction Heating Using High-Frequency Currents. (In Russian.) E. D. Spivac and K. S. Kagan. *Stanki i Instrument* (Machine Tools and Equipment), v. 20, Sept. 1949, p. 1-3.

Newly designed equipment of modified cast iron or ordinary gray iron. Structural features and optimum conditions of operation for different types of cast iron. (J2, T8, C1)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.S.

Using induction heating in case hardening of gear teeth. Stan.i instr. 29 no.6:31-32 Je '58. (MIRA 11:7)
(Case hardening) (Induction heating)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

S/121/60/000/008/007/012
A004/A002

AUTHOR: Kagan, Ye. S.

TITLE: The Strength of Contour-Hardened Gears

PERIODICAL: Stanki i instrument, 1960, No. 8, pp. 24-26

TEXT: The author describes tests which were carried out at ENIMS to find out the possibilities to contour-harden the teeth of small and medium module gears by induction heating on h-f devices with vacuum tube generators. The hardening of gears with modules in the range of 2.5-5.0 mm was effected by applying the method of continous-successive heating of tooth intervals and effective area of one tooth after the other under a water layer. Although this method is less efficient than e. g. the hardening by two-frequency induction heating or by through-induction heating of gears, made of steel with lowered hardenability, it can be successfully used for the hardening of gears with a small module. For under-water heating an inductor was used, the design of which is similar to the one used for the hardening of worms with a module in the range of 2.5-5 mm. The gears were preliminarily refined and possessed a hardness of H_B 212-217 ("45" grade steel) and H_B 228-255("40X" (40Kh)steel). The hardening temperature

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

BLINKOVA, T.M.; BYSTRIKOV, A.P.; KAGAN, Ye.S.; TUZOVA, G.Ya.

High-frequency hardening of spindle ends of machine tools. Stan.i instr. 33 no.7:33 Jl '62. (MIRA 15:7)
(Steel—Hardening)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ARDASHEV, B.I.; KAGAN, Ye.Sh.

Preparation of lepidine and its derivatives from aromatic amines and Mannich bases. Zhur. ob. khim. 34 no.7:2228-2230 Jl '64 (MIRA 17:8)

1. Novocherkasskiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Ye.Sh.; ARDASHEV, B.I.

Phenyllepidinium perchlorate. Metod. poluch. khim. reak. i prepar. no.11:99-101. '64. (MIRA 18:12)

1. Novocherkasskiy politekhnicheskiy institut. Submitted April 1964.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ARDASHEV, B.I.; KAGAN, Ye.Sh.

Lepidine. Metod. poluch. khim. reak. i prepar. no.11:63-64 '64.
(MIRA 18:12)

1. Novocherkasskiy politekhnicheskiy institut. Submitted April, 1964.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

[illegible], M. I.

28430

Pererabotka otkhodov khlopkovogo proizvodstva. Tekstil. Prom-st', 1949, No 9, S. 11-12

SO: LETOPIS No. 34

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, YU. A., Eng.

Bearings (Machinery)

Stamping bearing gaskets of an engine. Les. prom., 11, No. 7, 1951.

9. Monthly List of Russian Accessions, Library of Congress, December, 1952 1953. Unclassified.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

AUTHORS: Kagan, Yu. A., Smorodinskiy, Ya. A. SOV/56-34-5-55/61

TITLE: On the Anisotropy of the Even Photomagnetic Effect (Ob anizotropii chetnogo fotomagnitnogo effekta)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 5, pp. 1346 - 1347 (USSR)

ABSTRACT: Kikoin and Bykovskiy recently in the investigation of the even photomagnetic effect in semiconductors with a cubic lattice discovered clearly expressed anisotropy phenomena. This paper gives a purely phenomenological description of the character of this anisotropy. This problem is characterized by three factors: The magnetic field strength $\vec{H}$, the interior normal $\vec{n}$ of the illuminated surface of the semiconductor along which the diffusion of the liberated carriers takes place, and the electric field strength $\vec{E}$. The magnetic field is assumed to be sufficiently weak. Then with an accuracy to square terms (with regard to $\vec{H}$) the general expression

$E_i = L_{ik}n_k + L_{ikl}n_k H_l + L_{iklm}n_k H_l H_m$ can be written down. Furthermore, the Cartesian system of coordinates is assumed

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to coincide with the axes of the cubic crystal. The expression for E_i can be transformed to the form

$$E_i = L_1 n_i + L_2 e_{ikl} n_k H_l + L_3 n_i H^2 + 2L_4 H_i n_k H_k + L'_5 n_i \underline{H_i}^3,$$

$L'_5 = L_5 - L_3 - 2L_4$ (underlined indices are not to be summed up). The first term in this expression corresponds with the Dember effect (Ref 4), the second term with a certain photomagnetic effect, and the third term describes the even photomagnetic effect in that form as it occurs in an isotropic semiconductor. The last term indicates an anisotropy in the case of an even photomagnetic effect. When $\vec{H} \| \vec{n}$ the isotropic share of the even photomagnetic effect vanishes. Finally the expression of the magnetic field is written down for the special case that $\vec{n}$ agrees with the main diagonal axis. There are 6 references, 4 of which are Soviet.

SUBMITTED: February 21, 1958

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Yu.; AFANAS'YEV, A.M.

Kinetic theory of a gas with rotational degrees of freedom.
Zhur. eksp. i teor. fiz. 41 no.5:1536-1545 N '61. (MIRA 14:12)
(Molecular rotation)
(Gases, Kinetic theory of)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Yu.; MASLOV, V.A.

Mössbauer effect in monatomic and diatomic cubic lattices. Zhur. eksp.i teor.fiz. 41 no.4:1296-1303 O '61. (MIRA 14:10)
(Crystal lattices)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Yu. A

Anisotropy of Mössbauer's effect. Dokl. AN SSSR 140 no.4:794-796 O '61. (MIRA 14:9)

1. Predstavleno akademikom I.K.Kikoinym.
(Crystal lattices)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

9.4300 (1043, 1143, 1144)

S/056/61/040/001/029/037
B102/B212

AUTHOR: Kagan, Yu. A.

TITLE: Determination of the frequency distribution function of the phonon spectrum of crystals

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 1, 1961, 312-318

TEXT: So far, only the following two methods are known to determine the frequency distribution function of the phonon spectrum, which is very important when investigating properties of solids: Determining the frequency spectrum of cubic crystals having one atom per unit cell by coherent single-phonon neutron scattering, and the phonon spectrum of isotropic materials by studying the resonance absorption of gamma rays (Mössbauer effect), if one phonon is emitted. It would be very important for both of these two methods to find a theoretical solution to the problem of the frequency distribution function $\psi(\omega)$ for crystals having any type of symmetry, and any number of atoms per unit cell. To solve this problem is the aim of the present paper. V. S. Oskhotskiy has been

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B102/B212

Determination of the frequency...

the first to treat this problem. The processes to be considered are described analogously for single and multi-phonon transitions, only transitions where $\hbar\omega > \Gamma$ being considered at resonance absorption ($\hbar\omega$ phonon energy, Γ width of the resonance level). First, the Mössbauer effect is studied. A nucleus in a lattice site may change from an excited state A* into a state A by emitting a γ quantum. Taking the change of the phonon distribution into account, the matrix element for this transition is set up as: $M_\beta = \langle \vec{k}, A, \{n'\} | H_1 | A^*, \{n\} \rangle = M_{f.n.} \langle \{n'\} | \exp\{i\vec{k}\vec{R}_{m\beta}\} | \{n\} \rangle$. $\{n\}$ and $\{n'\}$ denote the total filling numbers of phonons before and after a nuclear disintegration, $M_{f.n.}$ is the matrix element corresponding to the decay of a free nucleus, $\vec{k}$ is the wave vector of the gamma quantum, $R_{\vec{m}\beta}$ is the coordinate of the β-th nucleus in the m-th unit cell at the time of decay. The following expression is thus obtained for a process involving s phonons:

$$|M_\beta^s|^2 = |M_{nn}|^2 \left(\frac{R_\beta}{N}\right)^s \exp\left\{-\frac{R_\beta}{N}\sum_{\alpha,l}' \frac{|qV_{\beta\alpha}(l)|^2}{\hbar\omega_\alpha(l)}[2\bar{n}_\alpha(l)+1]\right\} \times$$

$$\times \prod_{i=1}^{s} |qV_{\beta\alpha_i}(l_i)|^2 [\hbar\omega_{\alpha_i}(l_i)]^{-1} \left[\bar{n}_{\alpha_i}(l_i) + \tfrac{1}{2} \pm \tfrac{1}{2}\right]; \qquad (5)$$

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B102/B212

Determination of the frequency...

$R_\beta = \hbar^2 k^2 / 2 u_\beta$, $\vec{q}$ is the unit vector in $\vec{k}$-direction, $\bar{n}$ is a value of equilibrium corresponding to the crystal temperature, $\vec{f}$ and ω_α denote the wave vector and the frequency of a phonon, α is the number of the branch, N is the number of unit cells in a crystal, u_β is the mass of the β-th atom; the complex amplitude $\vec{V}_{\beta\alpha}$ is orthonormalized by the condition $\sum_\beta \vec{V}_{\beta\alpha}(\vec{f}) \vec{V}^*_{\beta\alpha'}(f') = \delta_{\alpha\alpha'}$. The emission probability of a quantum in direction $\vec{q}$ with an energy E_γ in an s-phonon process is obtained by using the perturbation theory:

$$W^s_\beta(E_\gamma, q) = W_0 e^{-2R_\beta} (R_\beta)^s \frac{(v_0)^s}{(2\pi)^{3s}} \frac{1}{s!} S \sum_{\alpha_1 \ldots \alpha_s} \int d^3 f_1 \ldots d^3 f_s \times$$

$$\times \prod_{i=1}^{s} |q V_{\beta\alpha_i}(f_i)|^2 [\hbar\omega_{\alpha_i}(f_i)]^{-1} (\bar{n}_{\alpha_i} + \tfrac{1}{2} \pm \tfrac{1}{2}) \delta(E_\gamma - E_0 \pm \hbar\omega_{\alpha_1} \pm \ldots \pm \hbar\omega_{\alpha_s}) \equiv$$

$$\equiv W_0 F^s_\beta(E_\gamma, q). \qquad (7)$$

E_0 is the energy of the excited level, W_0 the γ-decay probability for a free nucleus, v_0 the volume of the unit cell, S the sum over s+1 different

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Determination of the frequency...

combinations of absorbed and emitted phonons, and

$$Z_\beta = R_\beta \frac{v_0}{(2\pi)^3} \sum_\alpha \int d^3 f \frac{|qV_{\beta\alpha}(f)|^2}{\hbar\omega_\alpha(f)} (2\bar{n}_\alpha(f) + 1). \quad (8)$$

If in an interval $\Gamma \ll \Delta E < \hbar\omega_{max}$ single-phonon processes mainly take part, then the resonance absorption cross section is given by

$$\sigma^1(\Delta E, q) \equiv \sigma^{01}(\Delta E, q) + \sigma^{10}(\Delta E, q) = Q \frac{v_0}{(2\pi)^3} R \frac{1}{qq'} q^i q^k \times$$

$$\times \sum_{\beta,\lambda} \exp(-Z_\beta - Z'_\lambda) \left\{ \sum_\alpha \int d^3 f \frac{V^i_{\beta\alpha}(f) V^{\lambda *}_{\beta\alpha}(f)}{\hbar\omega_\alpha(f)} (\bar{n}_\alpha(f) + 1)\, \delta(\Delta E - \hbar\omega_\alpha) + \right.$$

$$\left. + \sum_\xi \int d^3 f \frac{V'^i_{\lambda\xi}(f) V'^{\lambda *}_{\lambda\xi}(f)}{\hbar\omega'_\xi(f)} (\bar{n}'_\xi(f) + 1)\, \delta(\Delta E - \hbar\omega'_\xi) \right\}. \quad (11)$$

With $\psi(\omega)d\omega = \frac{1}{3} v_0 (2\pi)^{-3} \sum_\alpha \Delta\omega_\alpha \int_{\omega=d\omega} d^3 f$ yields

$$\frac{1}{3} \sum_\beta \sigma^1(\Delta E, q_\beta)/\sigma^0(q_\beta) = \frac{\pi\Gamma}{k} \frac{R}{\Delta E} \psi\left(\frac{\Delta E}{k}\right) e^{\Delta E/\varkappa T} [e^{\Delta E/\varkappa T} - 1]^{-1} +$$

$$+ \psi'\left(\frac{\Delta E}{k}\right) e^{\Delta E/\varkappa T'} [e^{\Delta E/\varkappa T'} - 1]^{-1}.$$

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If source and target have the same lattice, then $\mathbf{T}=\mathbf{T}'$ and $\gamma(\Delta E/\hbar)$ is uniquely determined by (14). When measuring $\sigma^1(\Delta E, \vec{q})$ and $\sigma^0(\vec{q})$, it is possible to determine the frequency distribution along three directions of a crystal having any symmetry. If these three directions are perpendicular to each other, then σ^1/σ^0 is defined by

$$\frac{1}{3}\sum_l \sigma^1(\Delta E, q_l)/\sigma^0(q_l) = \frac{1}{3}\pi\Gamma R v_0 (2\pi)^{-3}\times$$

$$\times\left\{\frac{1}{g}\sum_{\alpha,\beta}\int d^3f V_{\beta\alpha}(\mathbf{f})\, V^*_{\beta\alpha}(\mathbf{f})\,[\hbar\omega_\alpha(\mathbf{f})]^{-1}(\bar{n}_\alpha+1)\,\delta(\Delta E-\hbar\omega_\alpha)+\right.$$

$$\left.+\frac{1}{g'}\sum_{\xi,\lambda}\int d^3f V_{\lambda\xi}(\mathbf{f})\, V^*_{\lambda\xi}(\mathbf{f})\,[\hbar\omega'_\xi(\mathbf{f})]^{-1}(\bar{n}'_\xi+1)\,\delta(\Delta E-\hbar\omega'_\xi)\right\}. \quad (15)$$

The results obtained can be applied easily to an incoherent scattering of "cold" neutrons. A single-phonon process in a monocrystal having any symmetry is defined

$$d\sigma^1(\mathbf{k}_1)/d\mathbf{k}_1 = \sigma^0(\mathbf{k})\,(\hbar^3 R/mk_0 g)\,q^l q^k v_0 (2\pi)^{-3}\times$$

$$\times\sum_{\alpha,\beta}\int d^3f v'_{\beta\alpha}(\mathbf{f})\, v^{\lambda*}_{\beta\alpha}(\mathbf{f})\,[\hbar\omega_\alpha(\mathbf{f})]^{-1}[(\bar{n}_\alpha+1)\,\delta(E_0-E_1-\hbar\omega_\alpha)+$$

$$+\bar{n}_\alpha\delta(E_0-E_1+\hbar\omega_\alpha)], \quad (17)$$

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or $$\frac{1}{3}\sum_{l}^{3}\frac{1}{\sigma^{0}(k)}\frac{d\sigma^{1}(k_1)}{dk_1}\Big|_{l}=\frac{\hbar^{2}}{2mk_{0}\mu}\frac{k^{2}}{\Delta E}\Psi\left(\frac{\Delta E}{\Lambda}\right)\left[e^{\Delta E/\varkappa T}-1\right]^{-1},\qquad(19),$$

$\sigma^{0}(k)$ is the differential elastic scattering cross section with respect to the unit solid angle. The neutron energy E_0 is smaller than Debye's, and $T_{cryst} \lesssim \theta_D$, $\mu \gg m$, m being the neutron mass; for this case $d\sigma^{1}(\vec{k}_1)/d\vec{k}_1$ and $\sigma^{0}(\vec{K})$ have to be measured for three different positions of the crystal, in order to determine the phonon spectrum of a crystal having any symmetry and any number of atoms of the same type per unit cell. The author thanks Ya.A. Smorodinskiy for discussions. There are 4 references: 1 Soviet-bloc and 2 non-Soviet-bloc.

SUBMITTED: July 30, 1960

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

S/056/62/043/004/043/061
B125/B186

AUTHORS: Afanas'yev, A. M., Kagan, Yu.

TITLE: Peculiarities in the phonon dispersion law related to electron-phonon interaction

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 4(10), 1962, 1456-1463

TEXT: It is shown that the peculiarities in the dispersion law are of such a nature that the shape of the Fermi surface is essentially related to them. The electron-phonon system is investigated at T = 0 by the method of the two-time Green's functions. The Dyson equation for the usual Hamiltonian of this system contains the polarization operator $\Pi(\vec{q},\omega)$. $G(\vec{p},\omega)$ is the Green function for the electrons and $\Gamma(\vec{p},\epsilon;\ \vec{q},\omega)$ is the vertex part. The Green function is used alone when electron-photon interaction is absent. The polarization operator for nearly cylindrical Fermi surfaces reads as

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Peculiarities in the phonon ...

$$\mathrm{Re}\,\Pi(q,\omega)=\frac{m^{*}p_{z0}}{2\pi^{2}}\,\mathrm{Re}\left\{1-\frac{1}{2}\left(1-\frac{4p_0^2}{q_\perp^2}-\frac{4m\omega}{q_\perp^2}\right)^{1/2}-\frac{1}{2}\left(1-\frac{4p_0^2}{q_\perp^2}+\frac{4m\omega}{q_\perp^2}\right)^{1/2}\right\}, \qquad (8).$$

$$\mathrm{Im}\,\Pi(q,\omega)=\frac{m^{*}p_{z0}}{4\pi^{2}}\,\mathrm{Im}\left\{\left(1-\frac{4p_0^2}{q_\perp^2}-\frac{4m\omega}{q_\perp^2}\right)^{1/2}-\left(1-\frac{4p_0^2}{q_\perp^2}+\frac{4m\omega}{q_\perp^2}\right)^{1/2}\right\}.$$

The following expressions hold for the dispersion and for the attenuation of the phonon branch of excitation:

$$\omega_q^2=(\omega_q^0)^2-2\omega_q^0A_q^2\,\mathrm{Re}\,\Pi(q,\omega_q),$$
$$\gamma_q=\frac{\omega_q^0}{\omega_q}\,\mathrm{Im}\,\Pi(q,\omega_q)\Big/\left[1+\frac{\omega_q^0}{\omega_q}\frac{\partial\,\mathrm{Re}\,\Pi(q,\omega_q)}{\partial\omega_q}\right]. \qquad (9),$$

where $\omega=\omega_{\vec{q}}-i\gamma_{\vec{q}}$. It is assumed that $\gamma_{\vec{q}}/\omega_{\vec{q}}\ll 1$. If, in the neighborhood of a certain point, the series expansion begins with a power greater than two, then a root type singularity is obtained and the

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index of the root $< 1/2$. The intensification of the nature of the singularity when the Fermi surface becomes nearly cylindrical is due to an increase in phase volume. The phase volume corresponds to the production of electron-hole pairs with fixed total momentum. The position is very similar when one of the radii of curvature of the Fermi surface is very large. In the limiting case of a plane and for the quadratic dispersion law, the following expression holds for the polarization operator:

$$\Gamma_1(\mathbf{p}, \varepsilon; \mathbf{q}, \omega) = -\frac{i}{(2\pi)^4}\int G_0\left(\mathbf{p}' + \frac{\mathbf{q}}{2}; \varepsilon' + \frac{\omega}{2}\right) G_0\left(\mathbf{p}' - \frac{\mathbf{q}}{2}, \varepsilon' - \frac{\omega}{2}\right) \times \quad (14).$$
$$\times D_0(\mathbf{p} - \mathbf{p}', \varepsilon - \varepsilon')\, d\mathbf{p}'\, d\varepsilon'.$$

There are 4 figures.

SUBMITTED: April 29, 1962

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Yu., red.; ZHABOTINSKIY, Ye.Ye., red.; BELEVA, M.A., tekhn. red.

[The Mossbauer effect]Effekt Messbauera; sbornik statei. Pod red. IU.Kagana. Moskva, Izd-vo inostr. lit-ry, 1962. 444 p. (MIRA 16:1)

(Mossbauer effect)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

S/056/62/042/001/039/048
B102/B108

AUTHORS: Kagan, Yu., Iosilevskiy, Ya. A.

TITLE: The Mössbauer effect for an impurity nucleus in a crystal. I

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 259 - 272

TEXT: Up to now the Mössbauer effect in a solid has been investigated for regular lattices only. The present paper considers a crystal with low impurity concentration, such that an impurity atom can be assumed isolated. The probability of the Mössbauer effect on such an impurity atom at a lattice site is calculated. Changes in mass and force constants are taken into account. The probability is obtained as the product of the probabilities of the absence of excitation in the continuous and discrete spectra, respectively:

$$W = W_1 W_2; \quad (2.4)$$

$$W_1 = \exp\left\{-\sum_{\beta} |\mathbf{k}\mathbf{u}_{1\beta}|^2\right\}, \quad (2.5)$$

$$W_2 = |\langle n|e^{i\mathbf{k}\mathbf{u}_1}|n\rangle|^2, \quad (2.5').$$

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

The Mössbauer effect for an ...

The equations for the frequencies of the perturbed spectrum

$$j^l = D^{lk}(\omega^2)\, j^k; \tag{3.16}$$

$$D^{lk} = \frac{\omega^2}{N(1-\gamma)} B^{lk} \sum_{f,\alpha} \frac{e^l(f,\alpha)\, e^k(f,\alpha)}{\omega^2 - \omega_0^2(f,\alpha)}. \tag{3.17}$$

are solved in order to determine the effect of the discrete frequencies on the Mössbauer effect. The tensor

$$T^{ll}(\omega^2) = \delta^{ll} \frac{1}{3N} \sum_{f,\alpha} \frac{1}{\omega^2 - \omega_0^2(f,\alpha)}. \tag{4.1}$$

for a cubic lattice is introduced. For $T \to 0$ one has

$$W_s \approx \exp\left\{-\frac{R'}{\hbar\langle\omega_0^2\rangle^{1/2}} \sqrt{\frac{\overline{m'}}{m}} \frac{1-\gamma}{(\varepsilon-\gamma)^{1/2}} \times \right. \tag{4.11}.$$

$$\left. \times \left[1 - \frac{(1-\varepsilon)(2\varepsilon-3\gamma+1)}{2(\varepsilon-\gamma)^3(1-\gamma)} \left((\varepsilon-2\gamma+\gamma^2)\frac{\langle\omega_0^4\rangle}{\langle\omega_0^2\rangle^2} + \gamma(1-\gamma)\right)\right]\right\}.$$

R' is the recoil energy of the impurity nucleus. It can be seen that with decreasing mass of the radiating atom ($\varepsilon \to 1$) the exponent increases as

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The Mössbauer effect for an ...

$1/\sqrt{m'}$. It is evident that with decreasing m' the frequency of the localized levels increases and the excitation probability of these levels is reduced. With increasing temperature W_2 decreases considerably slower than W_1. The effect of the quasi-continuous spectrum on the Mössbauer effect is

$$W_1 = \exp\left\{-\frac{R}{\hbar(1-\gamma)^2}\int_0^{\omega_{0\,max}^2} d\omega_0^2\,\frac{g(\omega_0^2)}{\omega_0}\,\frac{1}{|1-b(\omega_0^2)S(\omega_0^2)|^2+|\pi b(\omega_0^2)\omega_0^2 g(\omega_0^2)|^2}\times\right.$$
$$\left.\times\,(2\bar{n}(\omega_0)+1)\right\}. \qquad (5.15)$$

for a cubic lattice. If the mass of the impurity atom is great and if $\gamma \gg 0$, $\varepsilon \sim \sqrt{\omega_0^2}$, T=0 one obtains

$$W_1 = \exp\left\{-\frac{R_1}{\hbar\omega_{0\,max}}\frac{1}{(1-\gamma)^2}\left[\frac{\langle\omega_{0\,max}^2/\omega_0^2\rangle}{|b_0|(1+b_2\langle\omega_{0\,max}^2/\omega_0^2\rangle)}\right]^{1/2}\right\}, \qquad (5.16)$$

$$W_2 = 1.$$

which becomes

$$W_1 = \exp\left\{-\frac{R}{\hbar}\left\langle\frac{1}{\omega_0^2}\right\rangle^{1/2}|\varepsilon|^{-1/2}\right\}. \qquad (5.17)$$

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

S/056/62/042/005/037/050
B108/B138

AUTHOR: Kagan, Yu.

TITLE: Inelastic scattering of slow neutrons from arbitrary crystals and the general problem of reconstructing the phonon spectrum

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 5, 1962, 1375-1385

TEXT: The crystal under consideration has an arbitrary number of atoms in the unit cell, and the strictly inverse problem of reconstructing the phonon spectrum is studied. The problem consists in determining under what conditions measurement of the "cold" neutron differential inelastic scattering cross section could be used to determine the crystal phonon spectrum. The possibility of distinguishing coherent and incoherent scattering is demonstrated. To distinguish the distribution function of the phonon spectrum frequencies, it was found that incoherent scattering must be measured from crystals with different isotopic compositions, at least as many as there are different atoms per unit cell.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

AFANAS'YEV, A.M.; KAGAN, Yu.

Theory of the hyperfine structure of the Mossbauer line in paramagnetic substances. Zhur. eksp. i teor. fiz. 45 no.5: 1660-1677 N '63. (MIRA 17:1)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, YU. (M.), BRYUKHANOV, V. A., DELYAGIN, N. N.,

Probably Yu. M

"The Mossbauer Effect of Sn^{119} in Vanadium, Gold, Platinum and Thallium,"

report presented at the 3rd Intl. Conf. on the Mossbauer Effect, Cornell, Univ., New York, 4-7 Sep 63.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Yu. M.
Probably Yu A.

"Mössbauer Effect and the Theory of the Crystal Lattice."

report submitted for the Conference on Solid State Theory, held in Moscow, December 2-12, 1963, sponsored by the Soviet Academy of Sciences.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

BRYUKHANOV, V.A.; DELYAGIN, N.N.; KAGAN, Yu.

Mossbauer effect on Sn^{119} nuclei in a vanadium matrix. Zhur. eksp. i teor. fiz. 45 no.5:1372-1377 N '63. (MIRA 17:1)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

KAGAN, Yu.; IOSILEVSKIY, Ya.

Anomalous behavior of the heat capacity of crystals with heavy impurity atoms. Zhur. eksp. i teor. fiz. 45 no.3:819-821 S '63. (MIRA 16:10)

(Crystals—Thermal properties)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

S/056/63/044/001/049/067
B102/B186

AUTHORS: Kagan, Yu., Iosilevskiy, Ya.

TITLE: The Mössbauer effect for an impurity nucleus in a crystal. II.

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 1, 1963, 284-302

TEXT: In article I (ZhETF, 42, 259, 1962) the authors developed a method for describing the Mössbauer effect for an impurity atom. For the case of a monatomic cubic lattice the probability of this effect was obtained explicitly for any mass ratio of the atoms. This method is now used for studying resonance absorption (emission) of gamma quanta by any impurity nuclei accompanied by changes in state of the macrosystem. Particular attention is paid to single-quantum transitions so as to obtain information on the spectrum of the impurity atom and the interrelation between single-quantum transition probability and the crystals' vibrational spectrum. The localized vibrations induced by the impurity emitters as well as the possibility of determining the frequency distribution function for an

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The Mössbauer effect for an ...

arbitrary regular lattice are investigated. General formulas are obtained describing the elastic and inelastic processes in arbitrary harmonic interaction of the particle system on gamma decay. The quasicontinuous and discrete spectra over the whole temperature range are considered. The temperature dependence of the probabilities of the Mössbauer effect, and of the single-quantum excitation in the case of resonance absorption are analyzed taking account of the role played by degeneracy. In the last chapter of the paper the results obtained for a simple unit-cell lattice when the central and noncentral interactions of the nearest neighbors are taken into account are compared with experimental data. This is done for Au^{197} impurity nuclei in Fe and Ni cubic lattices. There are 3 figures.

SUBMITTED: July 31, 1962

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

S/056/63/044/004/036/044
B102/B186

AUTHORS: Kagan, Yu., Iosilevskiy, Ya.

TITLE: Neutron scattering from crystals with impurity nuclei and the problem of reconstruction of the vibrational spectrum

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 4, 1963, 1375 - 1395

TEXT: Neutron scattering from crystals containing isolated impurity nuclei in a low concentration (so that incoherent scattering is also due to the presence of distorted regions distributed at random around the impurities) is theoretically analyzed. The latter effect makes it possible to obtain information both on the characteristics of the impurity site and on the vibrational spectrum of the basic ideal lattice. The crystal considered is assumed to be monatomic but of arbitrary symmetry; the impurities are located in lattice sites, interstitial impurities should have no significance. The mass ratio between impurity and basic atoms may be arbitrary. The cross sections for coherent and incoherent scattering corresponding to single-quantum excitations in the system are calculated. It is investigated how the contribution of incoherent scattering from impurities and the

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Neutron scattering from crystals...

distorted regions surrounding them might be singled out. It is shown that from the cross sections corresponding to this branch direct information may be obtained not only on the impurity atom but also on the frequency density distribution function of the phonon spectrum of the ideal crystal. The separation of the interesting term (incoherent scattering from the impurity region) is demonstrated for slow-neutron scattering in the case when there are no discrete frequencies. This term is analyzed with respect to its information contents.

SUBMITTED: November 22, 1962

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ACCESSION NR: AP4042410 S/0056/64/047/001/0366/0378

AUTHOR: Kagan, Yu.

TITLE: Contribution to the theory of the temperature red shift and the broadening of the Mossbauer line

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 1, 1964, 366-378

TOPIC TAGS: Mossbauer effect, temperature dependence, line broadening, line shift, crystal lattice, resonance scattering

ABSTRACT: Some of these results were reported by the author elsewhere (Report at All-Union Conference on Low-Temperature Physics, Leningrad, July 1962; see UFN v. 80, 331, 1963). The author checks theoretically whether the temperature-dependent red shift of the Mossbauer line, which is observed in many compounds, is accompanied by a temperature-dependent line broadening. In contrast with the findings of Snyder and Wick (Phys. Rev. v. 120, 128, 1960), it is

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ACCESSION NR: AP4042410

found that the broadening does exist. It is shown that the line width cannot be related with the statistical fluctuations of the various quantities involved in the theory, such as the angular momentum operator for the radiating nucleus. The shape of the line is found and a detailed analysis is made of the Mossbauer line broadening as the mass of the nucleus is changed by emission of a gamma quantum. This makes it possible to determine the limit which this imposes on the possible width of extremely narrow lines. The line shift in an arbitrary crystal is considered and it is shown that the value of the shift can be related to the crystal energy per atom only for an ideal crystal. For polyatomic lattices and when the radiator is a foreign atom in a host lattice, the temperature red shift of the Mossbauer line depends already in a complicated way on the crystal parameters. The connection between the probability of the Mossbauer effect at zero temperature and the temperature shift of the line is determined as a function of the temperature for a radiating atom in an arbitrary crystal, making

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it possible to relate this probability to a quantity whose experimental determination has a purely resonant character. Orig. art. has: 45 formulas.

ASSOCIATION: None

SUBMITTED: 20Feb64 ENCL: 00

SUB CODE: NP NR REF SOV: 009 OTHER: 006

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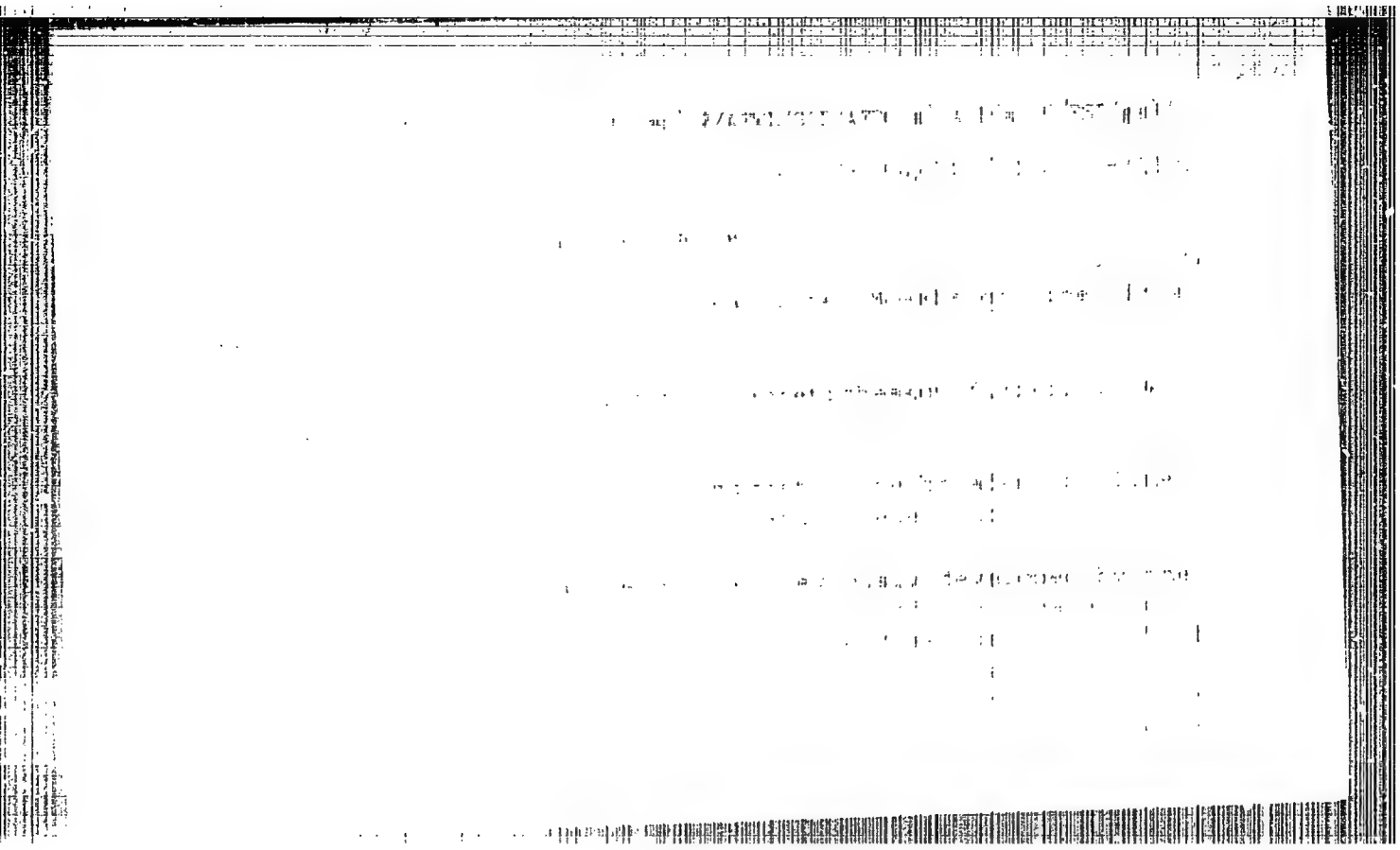

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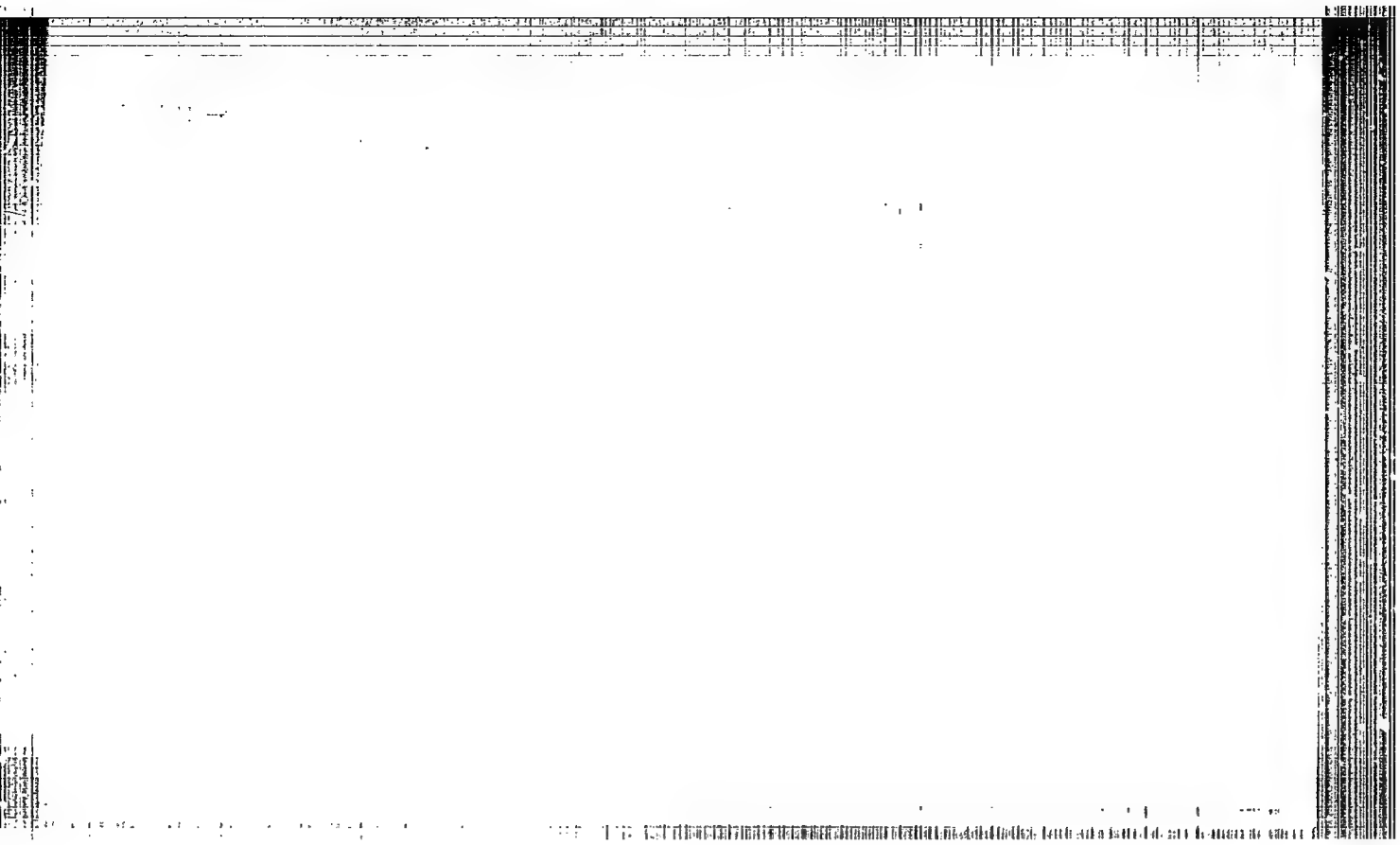

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ACCESSION NR: AP4042582 S/0056/64/046/006/2165/2182

AUTHORS: Iosilevskiy, Ya. A.; Kagan, Yu.

TITLE: Impurity atoms in lattices with optical oscillation modes. The Mossbauer effect. Infrared absorption

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 6, 1964, 2165-2182

TOPIC TAGS: Mossbauer effect, force constant, anisotropy, ir absorption, impurity center, energy gap

ABSTRACT: This is a continuation of earlier work on the theory of the Mossbauer effect for isolated impurity atoms in a crystal (ZhETF v. 42, 259, 962 and v. 44, 284, 1963). The theory is extended here to include crystals with an arbitrary number of atoms per unit cell. A detailed analysis is made of the oscillation of an impurity atom which is substituted for an arbitrary atom in a unit cell of a complex anisotropic crystal. The basic analysis is made for an impurity

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ACCESSION NR: AP4025912 S/0056/64/046/003/0825/0828

AUTHOR: Bryukhanov, V. A.; Delyagin, N. N.; Kagan, Yu.

TITLE: The Mossbauer effect on Sn-119 nuclei in gold, platinum, and thallium matrices

SOURCE: Zhurnal eksporimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 825-828

TOPIC TAGS: Mossbauer effect, tin 119, gold matrix, platinum matrix, thallium matrix, light Mossbauer atom, vibration spectrum, discrete frequency, recoilless resonant absorption, absorption probability, force constant, alloy concentration effect

ABSTRACT: Following an earlier similar investigation of the Mossbauer effect on Sn^{119} in a vanadium matrix, (ZhETF v. 45, 1372, 1963), the present study was undertaken for the purpose of an absolute comparison of theory and experiment in the case of a light Mossbauer atom, when there are no discrete frequencies in the vibration spectrum. To this end, the probability for recoilless resonant absorption of 23.8-keV gamma rays by Sn^{119} was measured in matrices of gold, platinum, and thallium over a wide range of temperatures. The measurements were made in solid solutions of tin in gold (1.7 and 3.2 at% tin), platinum (1.5 at% tin) and thallium

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ACCESSION NR: AP4025912

(3.6 and 9.2 at% tin). The experimental data were compared with the theoretical results of Yu. Kagan and Ya. A. Iosilevskiy (ZhETF v. 42, 259, 1962), which were obtained under the assumption that a force constant remain unchanged. The agreement obtained for the probability of the effect between the experimental and the theoretical values extends over a whole range of temperatures and is the same, within experimental error, for alloys with different concentrations. Orig. art. has: 1 figure and 1 formula.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Nuclear Physics Institute, Moscow State University)

SUBMITTED: 18Jul63 DATE ACQ: 16Apr64 ENCL: 01

SUB CODE: PH NO REF SOV: 004 OTHER: 000

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

L 1395-66 EWT(m)/T/EWP( )/EWP(b)/EWA(c) UJP(c) JD
ACCESSION NR: AT5022119 UR/3136/64/000/761/0001/0027

AUTHOR: Brovman, Yo. G.; Kagan, Yu.

TITLE: On the lattice vibration spectrum of white tin

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-761, 1964. O spektre kolebaniy reshetki belogo olova, 1-17

TOPIC TAGS: tin, group N element, lattice vibration spectrum, vibration frequency, dynamic matrix, group theory

ABSTRACT: A theoretical treatment of the lattice vibration of white tin (β - modification) is presented. The calculation is based on the Born von Karaman model. Ten force constants, which make up the complete dynamic matrix consisting of three coordination spheres, were used. The interaction with the fourth coordination sphere was assumed to be centrally symmetrical. In the evaluation of the dynamic matrix elements, use was made of the experimentally determined elastic lattice constants reported by I. A. Rayne and B. S. Chandrasekhar (Phys. Rev., 120, 1658, 1960) and of the data on the anisotropy of the Moessbauer Effect obtained by V. G. Shapiro and V. S. Shpinel' (ZhETF 46, 1960, 1964). The distribution of the 18 nearest atoms about a given central atom is shown in Fig. 1 on the Enclosure. The values of the derived force constants are given in Table 1 on the Enclosure. Expressions for the

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ACCESSION NR: AT5022119

force matrices for all the 18 nearest atoms and for the elements of the dynamic $D\alpha\beta\left(\frac{\vec{f}}{ik}\right)$ have been derived and are presented in Appendices I and II respectively. The frequency branches in the (100), (110), and (001) directions were derived by diagonalizing the dynamic matrix and by applying the group theoretical method of "reduced group symmetry." The expressions for the various frequencies are given in an appendix. The results of calculations are shown graphically. It is concluded that the nature of the anisotropy of the Moessbauer Effect is largely determined by the optical frequencies. Orig. art. has: 3 tables, 6 graphs, and 68 equations.

ASSOCIATION: Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii SSSR (State Committee for the Use of Atomic Energy, SSSR); Institut atomnoy energii im. I. V. Kurchatova (Institute for Atomic Energy)

SUBMITTED: 00 ENCL: 02 SUB CODE: SS

NO REF SOV: 003 OTHER: 013

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L 1395-66
ACCESSION NR: AT5022119

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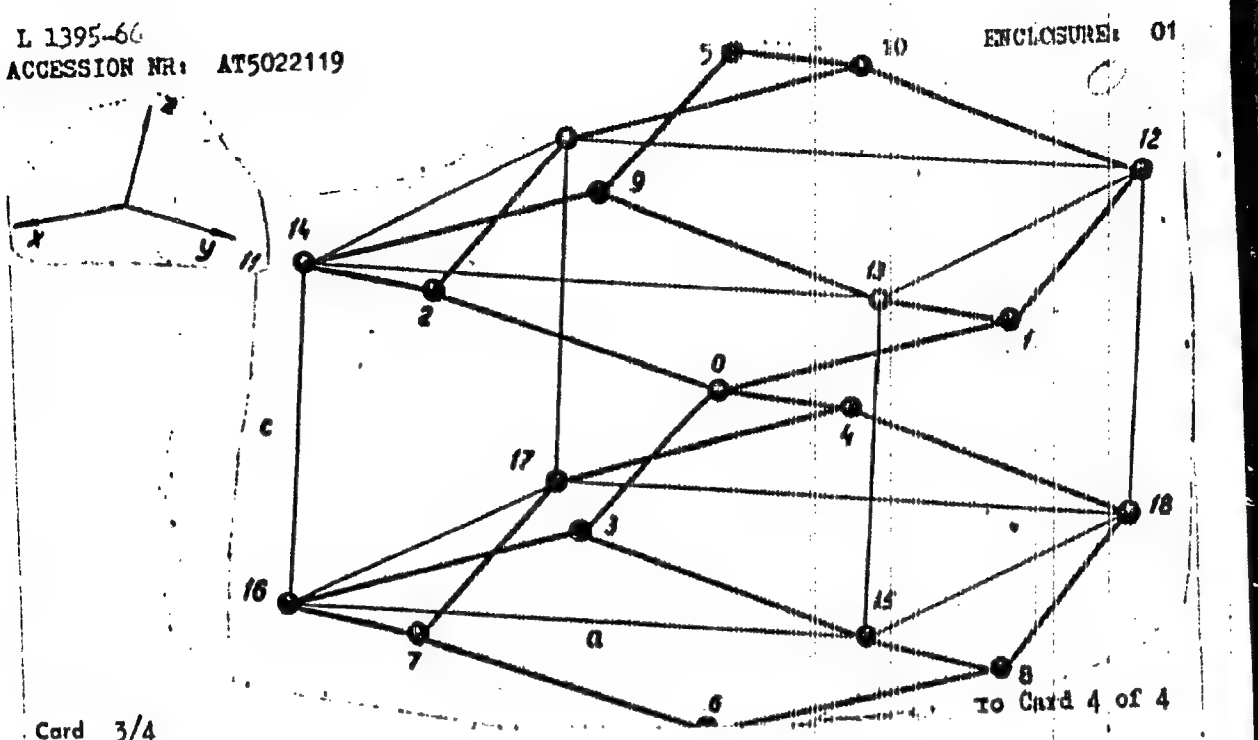

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Fig. 1. Distribution of the nearest 18 atoms about a given atom. Sphere I - atoms 1, 2, 3, 4; sphere II - 5, 6; sphere III - 7, 8, 9, 10; sphere IV - 11, 12, 13, 14, 15, 16, 17, 18

Table 1

d_1	β_1	γ_1	δ_1	d_2	d_3	β_3	γ_3	δ_3	λ
2562	-5.140	-5.777	2.410	8.28	10.990	0.78	13.478	8.672	3.0

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L 2340-66 EWT(1)
ACCESSION NR: AT5022104 UR/3136/64/000/750/0001/0011

AUTHORS: Kagan, Yu.; Zhernov, A. P.

TITLE: Effect of anharmonism on the phonon spectrum near a degeneracy point

SOURCE: Moscow. Institut atomnoy energii. /Doklady/, IAE-750, 1964. Vliyaniye angarmonizma na spektr fononov vblizi tochki vyrozhdeniya, 1-11

TOPIC TAGS: nuclear physics, phonon, spectrum, scattering cross section, slow neutron, Green function

ABSTRACT: Green's function $G_{\lambda\lambda'}(\omega)$ is used to analyze the effect of anharmonism on phonon spectrum near a degeneracy point. To take into account the effect of independent phonon branches on each other in the proposed harmonic oscillation, it becomes necessary to solve the Dyson equation

$$G_{ss'}(\omega) = G^{0}_{ss}(\omega)\delta_{ss'} + G^{0}_{ss}(\omega)P_{ss'}(\omega)G_{s's'}(\omega),$$

$$G^{0}_{ss}(\omega) = \frac{2\omega_s}{\omega^2 - \omega_s^2}.$$

For the case of a simple single-atom lattice, the solution of the Dyson equation

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

L 2340-66
ACCESSION NR: AT5022104 O

SUBMITTED: 00 ENCL: 00 SUB CODE: NP

NO REF SOV: 001 OTHER: 003

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

AUTHOR: Kagan, Yu. [redacted] 20-119-2-14/60

TITLE: On the Theory of the Bubble Chamber
(K teorii puzyr'kovoy kamery)

PERIODICAL: Dok'lady Akademii Nauk SSSR, 1958, Vol 119, Nr 2, pp 247-250 (USSR)

ABSTRACT: First the author shortly refers to previous papers dealing with the same subject. The here discussed attempt to explain the existing experimental data is based on the conception that the visible bubbles along the track are formed by the invasion of subcritical centers into the range of the main localization of the energy lost by the charged particle. Thus the radius of the center increases beyond the critical radius R_c. The author determines the range of localization and investigates, for reasons of security, fast heavy particles and a liquid the molecules of which consist of light atoms. In this he uses the fact that the influence of such a perticle is equivalent to the influence of

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perturbing potential (the center of which moves in a straight line with the constant velocity $\vec{v}$). First expressions for the transition probability and for the energy emitted in the volume unit are mentioned. Within the range $r \gtrsim a$ the slowing down of secondary electrons (which in the collision obtained an energy of $\gtrsim 2I$, with I denoting a certain mean ionization potential) will supply an essential contribution to the localization of the energy losses. The here discussed problem can be regarded as slowing down of electrons with the here given energy spectrum. These electrons are emitted from the line $r = 0$ at a right angle to them. In the slowing down of the secondary electrons a scattering occurs which after the passage of a layer of a certain thickness leads to a diffusion-type character of motion. For the density energy losses an expression is determined and put down in detail. Then also the total amount of the energy localized in unit volume at a distance r from the trace is written down.

Card 2/3 All processes take part, so to say, in a cylinder around

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the trace, the radius of which changes according to $1/\beta$. The visible bubbles along the trace are caused by the invasion of centers into the cylindrical volume. A given formula for the number of particles per unit length of the trace actually takes into account the purely thermal effect of the penetrating particle. The ions can promote the growth of the bubble only when they are distributed symmetrically around the center. The just mentioned formula describes qualitatively the existing experimental data. There are 7 references, 3 of which are Soviet.

PRESENTED: November 2, 1957, by I. K. Kikoin, Member, Academy of Sciences USSR

SUBMITTED: November 2, 1957

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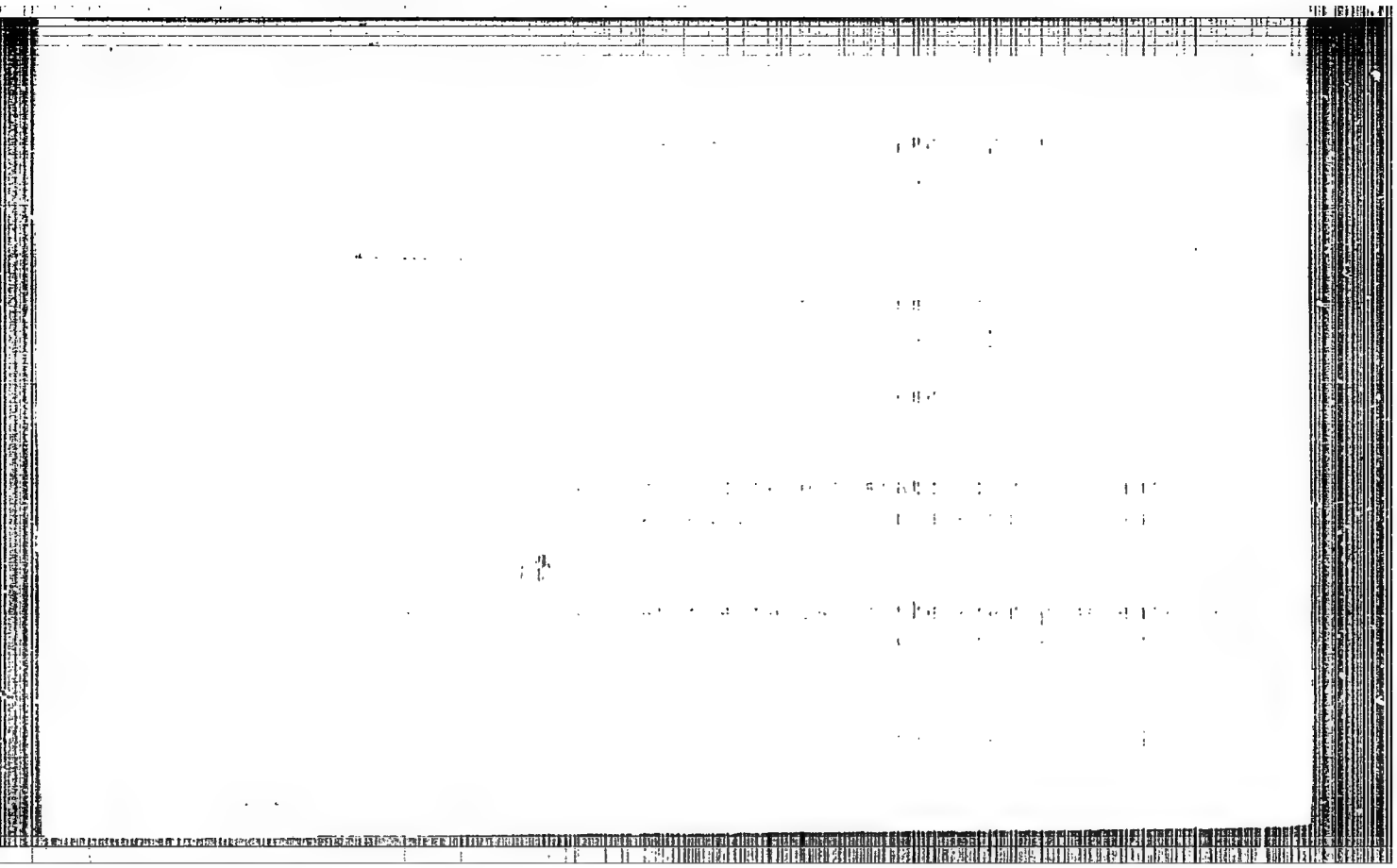

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ACCESSION NR: AP5000361

the crystal. This is done by expres-

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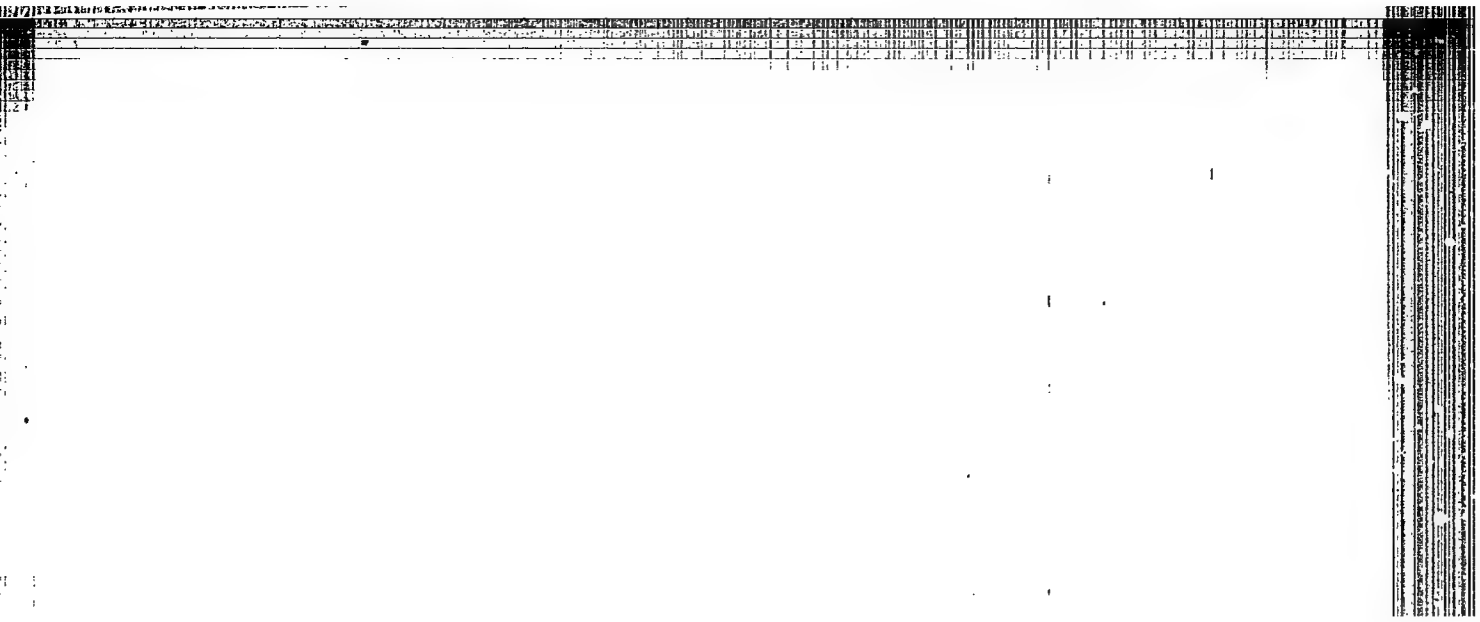

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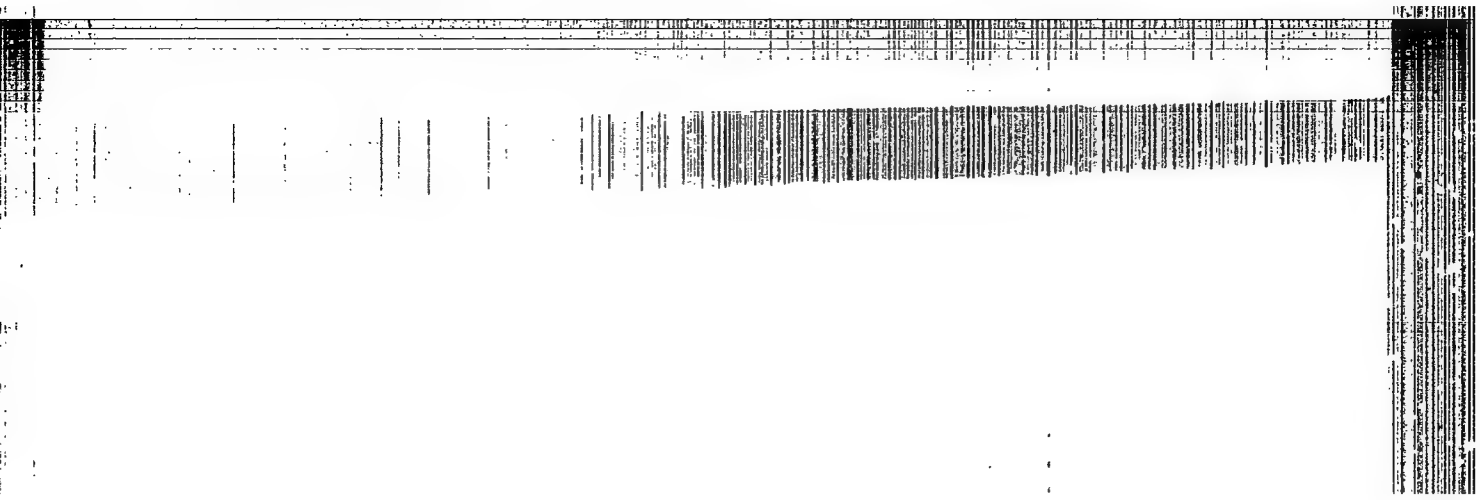

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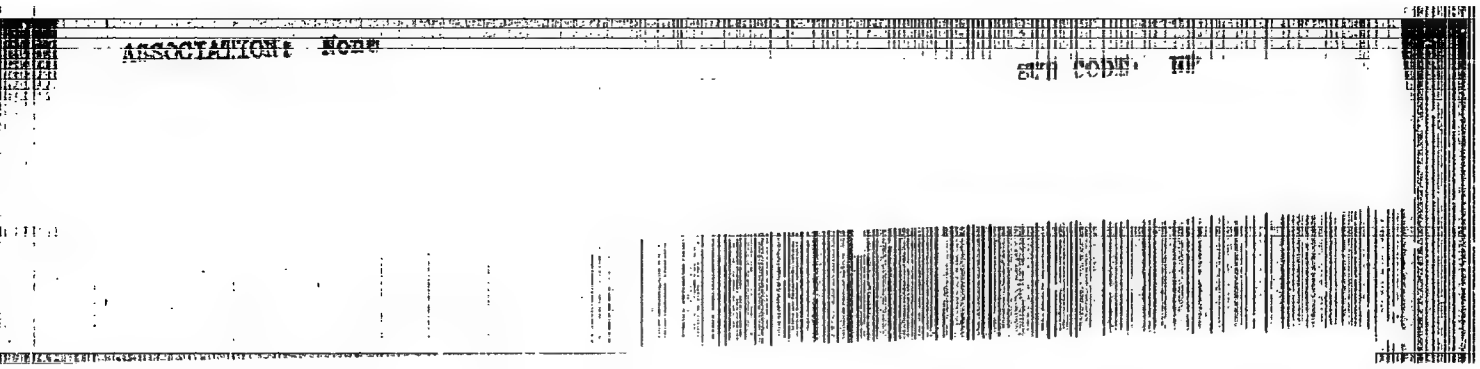

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L 15879-66 EWT(m)/T

ACC NR: AT6002493 SOURCE CODE: UR/3136/65/000/940/0001/0020

AUTHOR: Kagan, Yu.; Afanas'yev, A. M.

ORG: Institute of Atomic Energy im. I. V. Kurchatov (Institut atomnoy energii)

TITLE: Change in the resonance nuclear parameters in scattering on regular systems

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-940, 1965. Ob izmenenii rezonansnykh yadernykh parametrov pri rasseyanii na regulyarnykh sistemakh, 1-20

TOPIC TAGS: nuclear scattering, phonon scattering, excited state, ground state, nuclear spin, resonance scattering, elastic scattering, inelastic scattering

ABSTRACT: The study deals with scattering on systems of nuclei with low resonance levels. It is shown that if the nuclei form a regular unidimensional chain or two-dimensional lattice, the elastic width Γ_1 and the position of the resonance level undergo substantial changes. The change of width is shown to be connected with the lifetime of the collective excited state of the system of nuclei. The lifetime of this state as well as the width can be both greater and smaller than the lifetime (width) of the isolated excited nucleus. In the case of a three-dimensional crystal, the elastic width disappears entirely, and

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ACC NR: AT6002493

the energy dependence of the resonance interaction is determined solely by the inelastic width Γ_2. In the presence of spin in the ground state of the nucleus and when the role of inelastic phonon scattering is appreciable, the width takes on a value that is intermediate between Γ_2 and the total width. Authors are very grateful to A. I. Baz' for a useful discussion. Orig. art. has: 2 figures and 35 formulas.

SUB CODE: 18 / SUBM DATE: none / ORIG REF: 002 / OTH REF: 002

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L 4086-66 EWT(1)/T/EWA(h) LJP(c) AT

ACCESSION NR: AP5021729 UR/0386/65/002/002/0071/0075

AUTHOR: Kagan, Yu.; Sobakin, V.

TITLE: Anisotropy of the odd photomagnetic effect in semiconductors of cubic symmetry

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 2, 1965, 71-75

TOPIC TAGS: semiconductor carrier, germanium semiconductor, photomagnetic effect, relaxation process

ABSTRACT: The authors point out that although most earlier studies were devoted to even photomagnetic effects, it is possible to obtain in strong magnetic fields information on the behavior of purely anisotropic odd photomagnetic effects, depending on the magnitude and orientation of the magnetic field. Like the purely anisotropic even effects, the odd effects are determined by the carrier spectrum and the carrier relaxation times. A detailed analysis is presented for the case of germanium, in which photocarrier diffusion is produced in the direction of the [111] axis. An expression is derived for the emf of the odd photomagnetic effects and the variation of the emf with the field is investigated for different values

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ACCESSION NR: AP5021729

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of the angle between the magnetic field and carrier diffusion vector. Some of the data are shown in Fig. 1 of the Enclosure. The results are found to be in agreement with experimental data (I. K. Kikoin and S. D. Lazarev, ZhETF Pis'ma v redaktsiyu v. 2, 75, 1965). "The authors are grateful to Academician I. K. Kikoin and to S. D. Lazarev for supplying their experimental data prior to publication." [02]

Orig. art. has: 2 figures and 2 formulas.

ASSOCIATION: None

SUBMITTED: 25May65 ENCL: 01 SUB CODE: SS, EM

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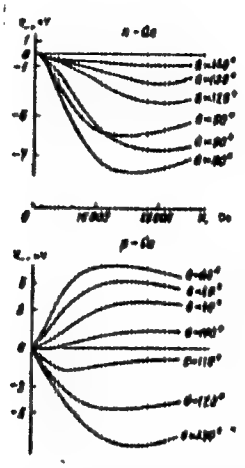

Fig. 1. Plot of the emf of the odd photomagnetic effect in Ge (arbitrary units) against the magnetic field for fixed field directions

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L 04103-67 EWT(l)/EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AT6031140 SOURCE CODE: UR/3136/65/000/028/0001/0032

64

AUTHOR: Kagan, Yu.; Zhernov, A. P.

8+1

ORG: none

TITLE: The theory of electroconductivity of metals with nonmagnetic impurities 16

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-1028, 1965. K teorii elektroprovodnosti metallov s nemagnitnymi primesyami, 1-32

TOPIC TAGS: electric conductivity, phonon, phonon spectrum, impurity conductivity, impurity scattering, nonmagnetic impurity

ABSTRACT: A theory of the electrical conductivity of metals containing impurities is developed which systematically accounts for the modification of the phonon spectrum arising in the presence of interstitial impurity atoms or with arbitrary changes in the amplitude of electron scattering by an individual ion. The extrinsic resistance factor is determined for the entire temperature range. Within the low-temperature range electron scattering by a fluctuating impurity ion is shown to produce the term $\sim T^2$, interference between scattering by an admixed ion and by a disturbed phonon spectrum to produce the term $\sim T^4$,

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ACC NR: AT6031140

and scattering by a deformed phonon spectrum to produce the term $\sim T^5$. (With a small amount of impurities all these terms are proportional to the concentration). The further behavior of the temperature of impurity resistance is characterized by several anomalies, particularly in the case of admixed heavy atoms, which is accompanied by the appearance of a quasi-local level. Within the high-temperature range the impurity resistance factor is found to vary linearly with temperature: furthermore, the derivative may have an arbitrary sign. A simple approximate relationship is shown to exist between the sign of this derivative and the relative position of admixed atoms and the matrix in the periodic system. A comparison is made with experimental data which demonstrates a qualitative agreement with the theoretical. Orig. art. has: 42 formulas and 3 figures. [Authors' abstract] [SP]

SUB CODE: 11, 20/ SUBM DATE: none/ ORIG REF: 016/
OTH REF: 009

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ACC NR: AP7004941 SOURCE CODE: UR/0386/67/005/002/0051/0054

AUTHOR: Kagan, Yu.; Afanas'yev, A. M.

ORG: none

TITLE: Anomalous diffuse small-angle Mossbauer scattering in crystals

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 5, no. 2, 1967, 51-54

TOPIC TAGS: Mossbauer effect, gamma scattering, resonance scattering, scattering cross section, small angle scattering

ABSTRACT: The authors show that although under normal conditions no anomalous scattering can be expected in small-angle scattering in crystals, a highly unique situation can arise in the case of resonant scattering of γ quanta by Mossbauer nuclei. Calculation of the scattering cross section for this case, with allowance for the fact that the phonon energy is in this case negligibly small compared with the γ-quantum energy, demonstrates the presence of anomalous diffuse small-angle scattering. The cross section tends to a finite limit as the wave vector tends to zero, and the use of the Mossbauer effect makes it possible to separate directly the radiation scattered through small angles from purely-resonant radiation that passes through the crystal without being scattered. This makes it possible to determine the anomalous scattering from measurements of the integral scattering cross section. Orig. art. has: 4 formulas.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ACC NR: AT7004919 SOURCE CODE: UR/3136/66/000/186/0001/0040

AUTHOR: Brovman, Ye. G.; Kagan, Yu.

ORG: none

TITLE: Phonon spectrum of metals. I. Phonon spectrum of metals. II. Vibration spectrum of tin

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-1186, 1966. O fononnom spektre metallov. I. O fononnom spektre metallov. II. Spektr kolebaniy olova, 1-40

TOPIC TAGS: metal physical property, tin, phonon spectrum, phonon interaction, vibration spectrum, electron scattering, ion interaction

ABSTRACT: In view of the fact that earlier investigations by the authors have shown that long-range interaction must be taken into account in a consistent description of the spectrum of phonons in the lattice of a metal, such as tin, the authors analyze this spectrum in this paper by separating the long-range interaction in explicit form, making it possible to decrease the number of force constants that have to be determined by experiment. It is shown first that the phonon spectrum of the metals can be determined with great accuracy within the framework of the usual adiabatic approximation, and that the correction terms can be obtained by ordinary stationary perturbation theory. It is shown that this reduces the determination of the metal phonon frequency to a calculation of the energy levels of the electron system in the field of rigidly fixed ions. This makes it possible to use the theory of electron scatter-

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ACC NR: AT7004919

ing by ionic cores. The authors then derive an expression for the effective interaction between the ions and the metals and calculate the dynamic vibration matrix for the phonons in the metal. Concrete calculations are then presented for white tin, with due allowance made for the specific feature of the scattering of cold neutrons by its lattice. It is shown that to determine the phonon spectrum of tin it is necessary to determine experimentally five parameters, the values of which are given. The relative role of the long-range and short-range forces in the formation of the phonon spectrum of tin is then analyzed. Orig. art. has: 6 figures and 63 formulas.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 011

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

ACC NR: AT7003231 SOURCE CODE: UR/0056/66/051/006/1893/1908

AUTHOR: Kagan, Yu.; Maksimov, L. A.

ORG: none

TITLE: Kinetic theory of gases with rotational degrees of freedom in an external field

SOURCE: Zh eksper i teor fiz, v. 51, no. 6, 1966, 1893-1908

TOPIC TAGS: transport phenomenon, magnetic field, gas kinetics, paramagnetic gas, collision cross section, gas viscosity, thermal conduction

ABSTRACT: This is a continuation of earlier work (ZhETF v. 41, 842, 1961) where the authors developed a theory of transport phenomena for a diatomic paramagnetic gas in a magnetic field. The present article is devoted to a general method for considering kinetic phenomena in polyatomic gases in the presence of either a magnetic or an electric field, inasmuch as either type of field produces qualitatively the same physical result, namely precession of the rotational molecular moment, which in turn causes an effective change in the collision cross section of the molecule. The method consists of expanding the nonequilibrium distribution function in terms of the eigenfunctions of an ideal collision operator, which takes into account only the change in translational degrees of freedom in the collisions. In this method the effect in an external field is reduced to finding the eigenfunction of the ideal collision operator and determining the matrix elements of the perturbing collision operator. The general

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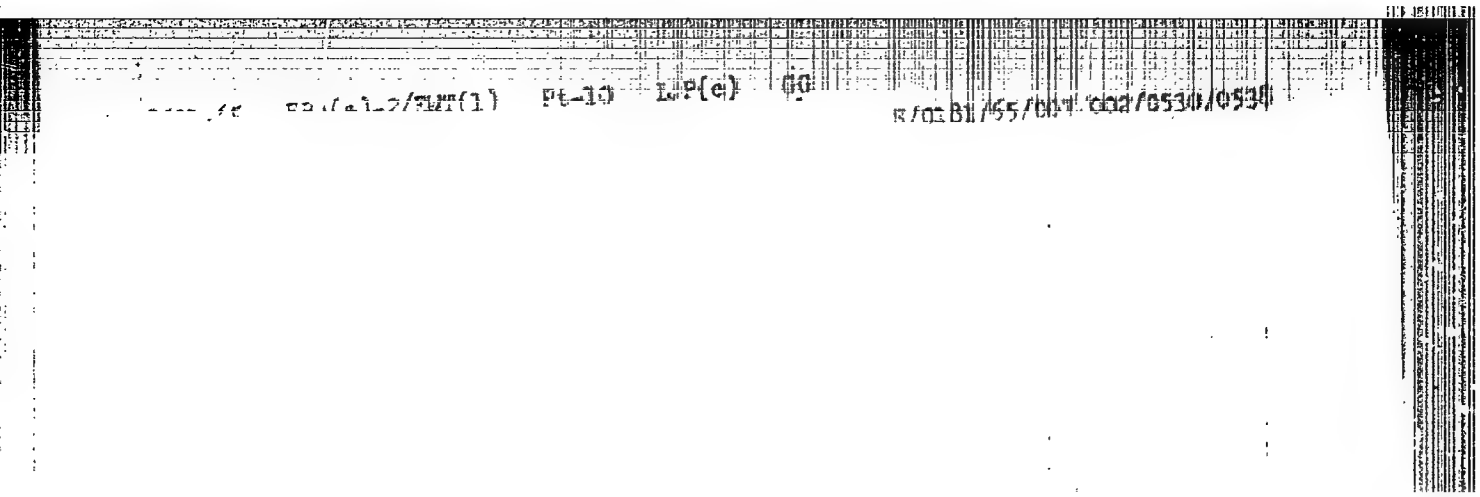

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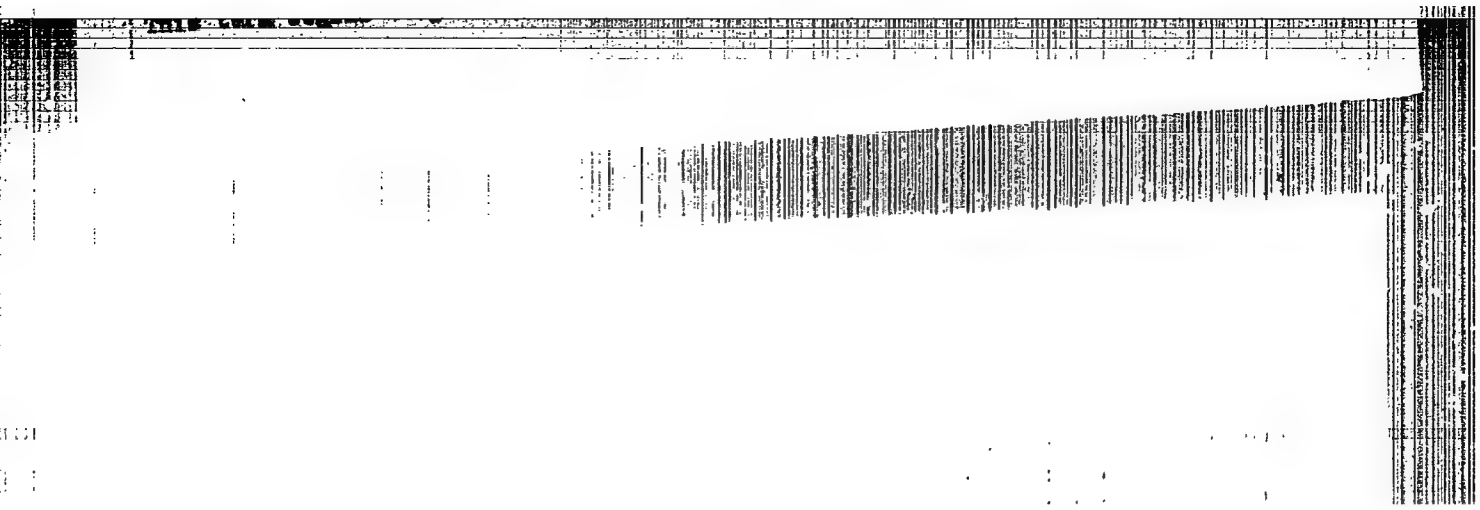

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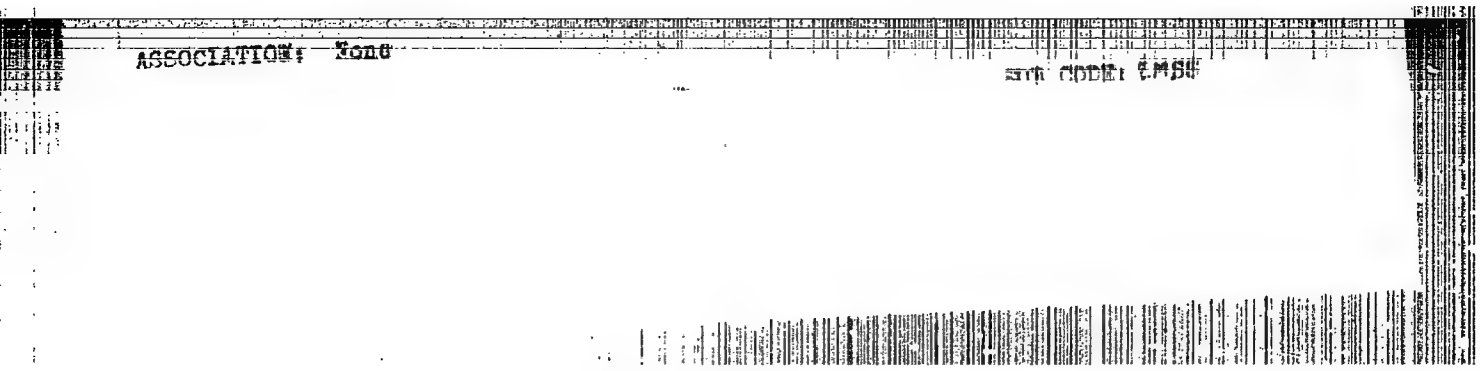

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L 15666-66 EWT(m)/EPF(n)-2/EWA(h)
ACC NR: AP6000208 SOURCE CODE: UR/0056/65/049/005/1504/1517

AUTHORS: Kagan, Yu.; Afanas'yev, A. M.

ORG: none

TITLE: Suppression of inelastic channels in resonance scattering of neutrons in regular crystals

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 5, 1965, 1504-1517

TOPIC TAGS: resonance scattering, inelastic scattering, neutron scattering, crystal lattice vibration, spin resonance, gamma quantum, neutron interaction

ABSTRACT: Following a theory previously developed by the authors (ZhETF v. 48, 327, 1965) for describing the results of resonance scattering of gamma quanta, the authors developed in this paper a dynamical theory which describes the motion of neutrons in a regular crystal when the interaction of the neutron with the individual nuclei is primarily resonant in character. Account is taken not only of the resonance character of the interaction but also of the presence of an

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intense inelastic channel, as well as of the vibration of the nuclei in the crystal. In addition, the spin interaction of the neutrons with the nuclei is taken into account, and allowance is made for the appearance of an additional incoherent scattering channel (spin incoherence). Particular attention is paid to relation between the intensity and the spatial distribution of the nuclear reaction in the crystal and the parameters of the problem. A detailed analysis is made of the effect of suppression of the inelastic channels and of the distribution of the intensity of the nculear reactions of the thickness of the crystal. Orig. art. has: 34 formulas.

SUB CODE: 20/ SUBM DATE: 26May65/ ORIG REF: 002/ OTH REF: 008

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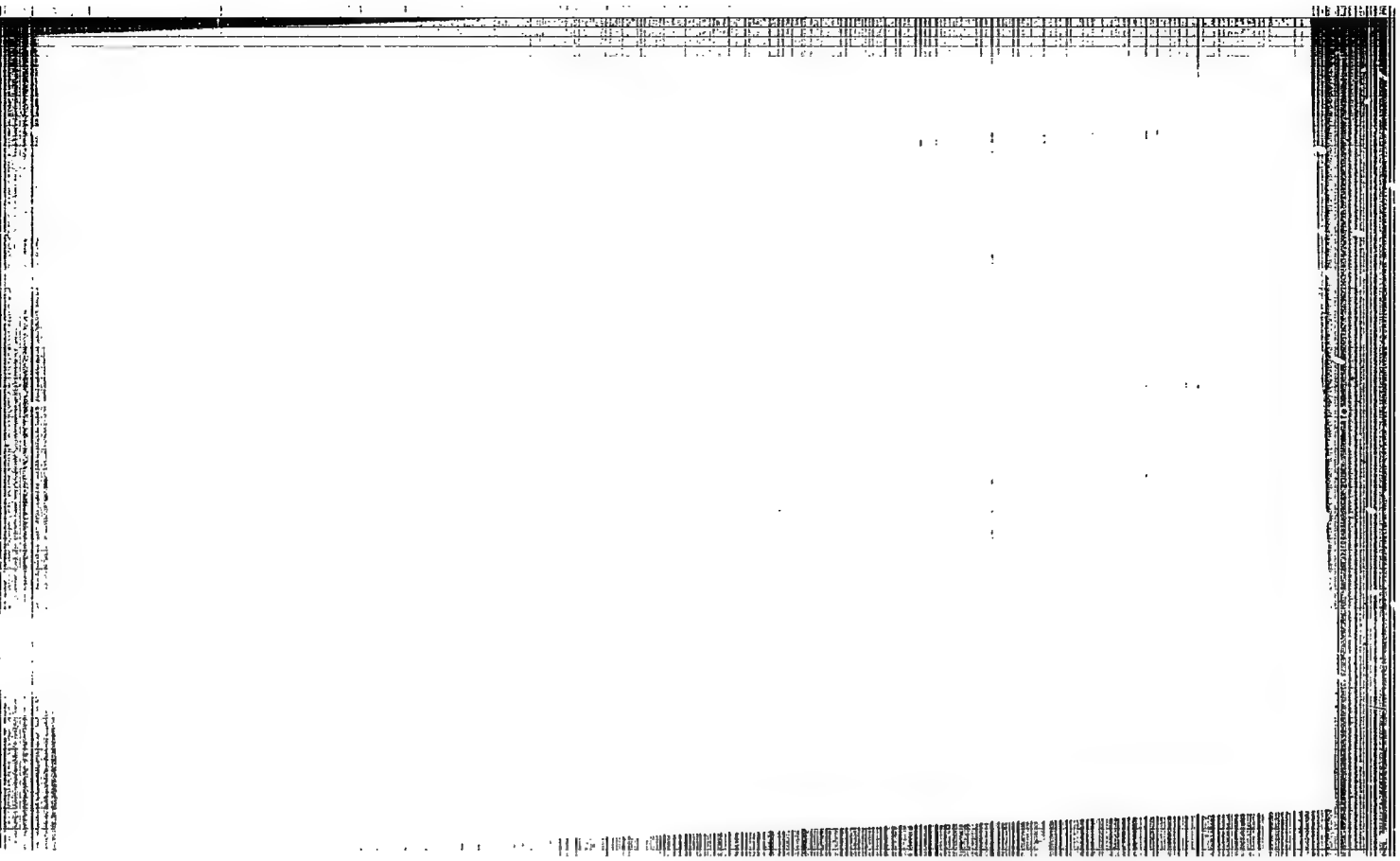

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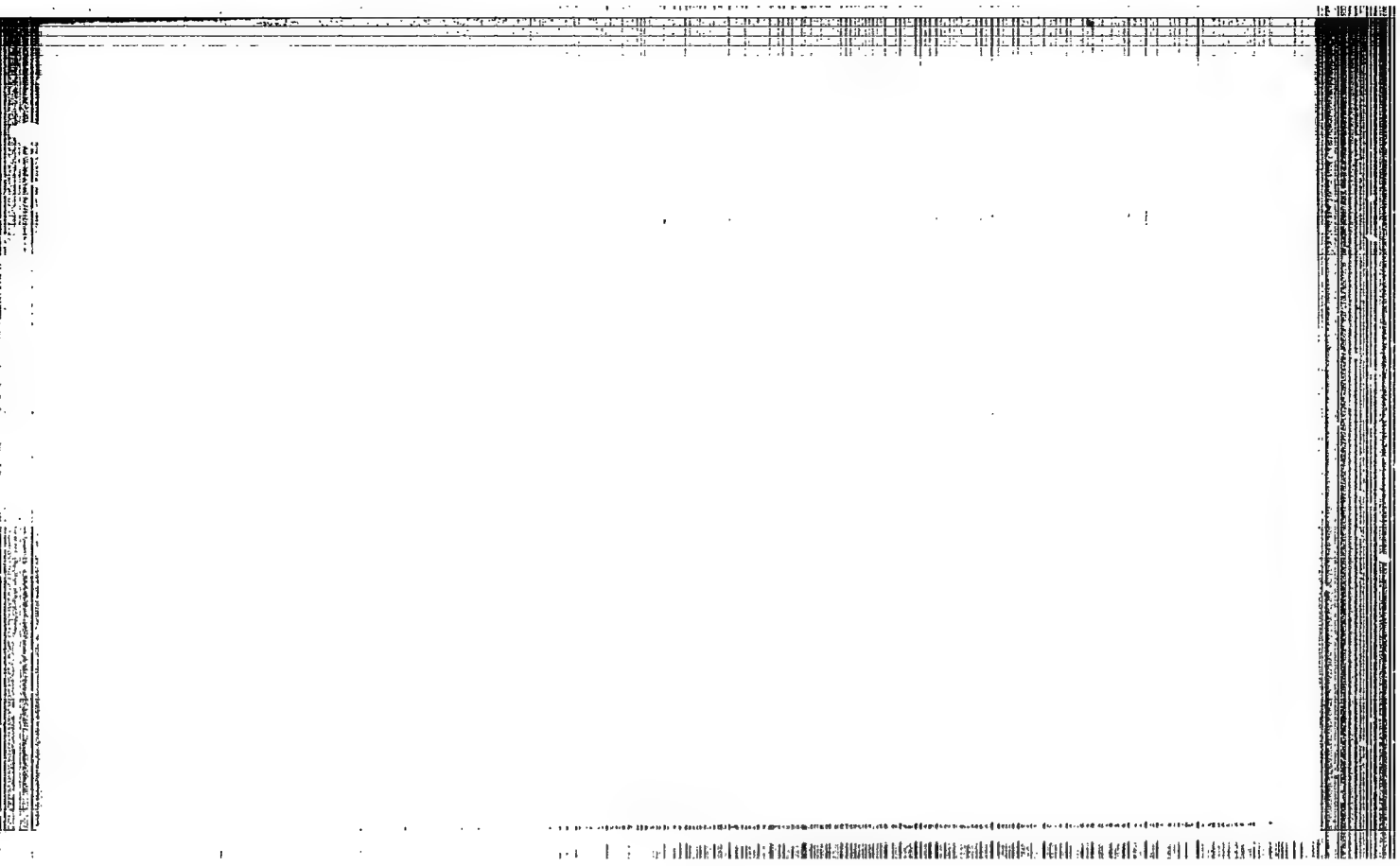

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ACC NR: AT6001b 4 SOURCE CODE: UR/3136/65/000/928/0001/0029

AUTHOR: Brovman, Ye. G.; Kagan, Yu.

ORG: none

TITLE: Phonon spectrum of white-tin lattice

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-928, 1965. O fononnom spektre reshetki belogo olova, 1-29

TOPIC TAGS: crystal lattice, phonon spectrum, tin

ABSTRACT: The results are reported of a consistent analysis of the dynamic problem of white-tin-lattice oscillations, within the framework of a Born-Karman model; all force constants entering the dynamic matrix for the first three coordination spheres are used. It is assumed that the interaction with the 4th, 5th, and 6th spheres can be approximately described, for each sphere, by one central and one noncentral force constant. In addition to elasticity moduli (L. A. Rayne and B. S. Chandrasecar, Phys. Rev., 120, 1658, 1960), experimental data on characteristic boundary spectrum frequencies in one of symmetrical directions has been used for

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5 (4)

S/076/60/034/01/015/044
B008/B014

AUTHOR: Kagan, Yu. (Moscow)

TITLE: The Kinetics of Boiling of a Pure Liquid

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 1, pp 92-101 (USSR)

ABSTRACT: In this paper the author studied the kinetics of boiling of a pure liquid with arbitrary parameters. The study is based upon Ya. B. Zel'dovich's method. In deriving formulas the author considered all the factors restricting the expansion velocity of bubbles, i.e., viscosity, inertia, evaporation rate into the vacuum, and the velocity of heat supply to the surface adjoining the vacuum. The solution of equation (24) or (24') allows to determine $(dn/dr)_k$ according to equation (22). Thus, also D_k (14) and J (12) are easily obtained in consideration of (13) (D_k = diffusion coefficient at the point $r = r_k$; r = radius of the boiling nucleus; J = const determines the number of transcritical nuclei formed per unit of time and volume). A special case is mentioned in which the effect of inertia terms may be ignored. Provided $2\sigma/r_k p_k \ll 3$ and the evaporation rate into the vacuum is decisive, the

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The Kinetics of Boiling of a Pure Liquid

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final result assumes the form corresponding to Döring's formula. There are 16 references, 2 of which are Soviet.

SUBMITTED: April 6, 1958

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619910018-6

Cyclotron Resonance in Germanium and Silicon, and the Part Played by the Negative Effective Masses

the valid dispersion law is given by (2.1). Four types of hodograph (cf. Fig. 1) are described, and the frequency spectrum corresponding to them is investigated. m_i^*/m_o is given for various numerical values of ω_i/ω_o of Ge and Si. The entire frequency spectrum corresponding to the germanium valency band is shown in Figs. 2 and 3 for the case in which $\vec{H}$ lies in the [001] axis. The type of cyclotron resonance depends essentially on the shape of this spectrum; the negative effective masses mentioned in Ref. 1 are connected only with the negative branch of frequencies corresponding to the hodograph of type III. In the next part of the paper, the solution of the equation of motion

$$\partial f/\partial t + \vec{v}\nabla f + \frac{\partial f}{\partial \vec{p}}\left(e\vec{E} + \frac{e}{c}[\vec{v}\vec{H}]\right) = L(f - f^{(0)}) + N - M$$ is given,

where $\vec{v} = \partial\varepsilon/\partial\vec{p}$, L - a linear operator corresponding to the collision integral, and N and M - terms describing the production and/or absorption of quasiparticles and relating to units of the phase space;

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L 8593-66 EWT(m)/EWP(b)/EWP(t) IJP(c) JD

ACCESSION NR: AP5019896 UR/0181/65/007/008/2565/2567

AUTHOR: Kagan, Yu.; Sobakin, V. N.

TITLE: Concerning the anisotropy of the even photomagnetic effect in germanium

SOURCE: Fizika tverdogo tela, v. 7, no. 8, 1965, 2565-2567

TOPIC TAGS: germanium, photomagnetic effect, physical diffusion, current carrier

ABSTRACT: This is a companion to an experimental paper in the same source (I. K. Kikoin and S. D. Lazarev, FTT v. 7, 2564, 1965; Acc. Nr. AP5019895), in which a theory previously developed by the authors (J. Phys. Chem. Sol. v. 26, 1965) is used to derive an expression for the even purely anisotropic photomagnetic effect in p-type semiconductors for arbitrary directions of the magnetic field and arbitrary diffusion direction of the photoproduced carriers. The particular case of p-Ge with the carriers diffusing along the (111) axis is treated. The theory as applied to this case predicts the behavior shown in Fig. 1 of the Enclosure. The experimental values obtained by Kikoin and Lazarev for the zeroes of the photomagnetic emf is in very close agreement with the theory. "The authors thank I. K. Kikoin and S. D. Lazarev for providing the experimental data prior to publication." Orig. art. has: 2 figures and 1 formula.

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